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COMMUNITY OF INTEREST SUPPLEMENTARY SERVICES

1 Closed user group

1.1 *Introduction*

The supplementary service closed user group (CUG) makes provision for a group of users to meet security requirements of certain applications by providing restrictions, which prevent non-members from reaching these applica-

The basic facility provides, via the ISDN, the CUG members with controlled intercommunication exclusively amongst themselves and denies access into or outside the group. This facility can be extended to include outgoing and/or incoming access for specified CUG members.

1.2 *Definition of functional model*

1.2.1 *Functional model description*

The high level functional model for the CUG service contains the network addressable functional entities described in Figure 1-1/Q.85.

Figure 1-1/Q.85, p.

1.2.2.1 *Outgoing CUG determination entity (FE2)*

It has the ability:

— to identify a CUG call;

— to check the CUG subscription of the calling user;

— to access the outgoing CUG control entity.

1.2.2.2 *Outgoing CUG control entity (FE3)*

It performs:

— the validation checks of CUG information of a calling user;

— the conversion of the CUG index to an interlock code.

1.2.2.3 *Incoming CUG determination entity (FE4)*

It has the ability:

— to identify a CUG call;

— to check the CUG subscription of the called user;

— to access the incoming CUG control entity.

1.2.2.4 *Incoming CUG control entity (FE5)*

It performs:

— the conversion of the interlock code to CUG index;

— the validation checks of CUG information of a called user (including the compatibility with the called user class — CUG IA — in case of an ordinary incoming call).

Note — FE3 and FE5 are coupled in the sense that they handle a common set of data (interlock codes).

1.2.3 *Relationship to basic service*

Refer to § 1.6 for the physical location of each entity residing in Figure 1-2/Q.85.

Figure 1-2/Q.85, p.

1.3 *Information flow description*

1.3.1 *Information flow diagrams*

Figure 1-3/Q.85, p.

Figure 1-4/Q.85, p.

Figure 1-5/Q.85, p.

1.3.2 *Definition of individual information flows*

The parameters that are carried on the information flows in the successful case are as follows:

1.3.2.1 SETUP (FE1-FE2) — In addition to called party number and CLI

— nothing, or

— index, or

— index + OA indication.

1.3.2.2 ENQUIRY (FE2-FE3) — Carries the same information as SETUP (FE1-FE2) except called party number.

1.3.2.3 ENQUIRY (FE3-FE2):

— nothing, or

— interlock code, or

— interlock code + OA indication.

1.3.2.4 SETUP (FE2-FE4) — In addition to called party number

— nothing, or

— interlock code, or

— interlock code + OA indication.

1.3.2.5 ENQUIRY (FE4-FE5) — Carries exactly the same information as SETUP (FE2-FE4).

1.3.2.6 ENQUIRY (FE5-FE6):

— nothing, or

— index, or

— index + OA indication.

1.4 *Functional entity actions*

FE1 — A user initiates call SETUP request with the CUG index code (when a preferential CUG is used, no index code is designated).

FE2 — identify a CUG call and receive CUG information,

— CUG subscription check of the calling user.

FE3 — Outgoing validation check:

1) CUG index code check of a calling user (when no index code is designated, preferential CUG is used);

2) outgoing barring check within CUG; when any logical contradiction is detected in the above procedure, a call is rejected (see Table 1-1/Q.85).

— conversi´on of the index code to an interlock code.

FE4 — identify an incoming CUG call and receive CUG information;

— CUG subscription check of the called user.

FE5 — incoming validation check:

1) incoming barring check within CUG;

2) if interlock codes do not match between a calling user and a called user, a call is rejected;

3) ordinary incoming call check (CUG IA); when any logical contradiction is detected in the above procedure, a call is rejected (see Table 1-2/Q.85).

— an index code corresponding to the designated interlock code is extracted from CUG data of a called user.

FE6 — a user checks whether or not the designated index code exists in the index code list of his own. A user shall give proper responses.

1.5 *SDL diagrams for functional entities*

1.5.1 *FE1 originating CUG agent*

FE1 has the same SDL diagram as the CCA FE (basic call) except that the SETUP information flow to the FE2 must carry additional information (index or index + OA or nothing).

1.5.2 *FE2 outgoing CUG determination*

Refer to the Figure 1-6/Q.85.

1.5.3 *FE3 outgoing CUG control*

Refer to Figure 1-7/Q.85.

1.5.4 *FE 4 incoming CUG determination*

Refer to Figure 1-8/Q.85.

1.5.5 *FE5 incoming CUG control*

Refer to Figure 1-9/Q.85.

1.5.6 *FE6 destination in CUG agent*

FE6 has the same SDL diagram as the CCA FE (basic call) except that the SETUP information flow to the FE6 must carry additional information (index or index + OA mark or nothing).

1.5.7 *Basic call hooks*

See Figure 1-10/Q.85.

H.T. [T1.85]

TABLE 1-1/Q.85

CUG interpretation table (outgoing side)

SETUP presentation Calling user class } No. CUG INFO. Ordinary subcriber } CUG	CUG with index OA = OFF CUG + OA (E)	CUG with index OA = ON CUG + OA (I)	CUG with index OA = ON pCUG	{	
Yes				Specified CUG | ua)	Sp
Specified CUG with OA | ub) }	Yes Ordinary call	Rejected		Specified CUG | ua)	{
Specified CUG with with OA | ua) } Specified CUG with OA | ub) }	{ Ordinary call	Yes Ordinary call		{	
Yes			Yes	Specified CUG | ua)	Sp
Specified CUG with OA | ub) }	Yes pCUG with OA | ub)	pCUG | ub) Yes	Yes	Specified CUG | ua)	{
Specified CUG with OA | ua) } Specified CUG with OA | ua) } Specified with OA | ua) }	{ { pCUG with OA | ub)	Yes	Yes	{	
Calling user is NOT CUG	REJECT	Ordinary call			

a) In case of OCB (CUG), a call is rejected

b) In case of OCB (CUG), a call is interpreted as an ordinary call

OA | E) Outgoing access explicit

AS | IM) Outgoing access implicit

OA Outgoing access allowed

OCB Outgoing access barred within the CUG

pCUG Preferential call

Note 1 — When an illegal index code is received, the outgoing call is rejected.

Note 2 — All the user classes are not necessarily supported by all the networks. User classes to be supported are network dependent.

POUR MONTAGE: Calling user is a CUG user EF3 EF2

Tableau 1-1/Q.85 [T1.85], p. 6

H.T. [T2.85]

TABLE 1-2/Q.85

CUG checking in incoming side

{	Called user is CUG CUG with or without pCUG No ICB	Called user is not CUG CUG IA with or without pCUG ICB	No ICB	ICB	
CUG	M (1) NM REJ	REJ	M (1)	REJ	REJ
CUG and OA	M (1) NM REJ	REJ	M (2)	(3)	(3)
Ordinary	REJ	REJ	(3)	(3)	T (3) | ua)

a) Performed in FE4.

ICB Incoming access barred within CUG

Note 1 — Since CUG OA user class is not concerned in the incoming case, it is not shown in the above list. It shall be regarded that CUG OA user class is the same as class CUG, and CUG OA/IA is the same as user class CUG IA in this table.

Most of the table is performed in FE5.

Note 2 — (1)-(3) shows CUG parameter to be used in the SETUP to the called user.

(1): CUG (index),

(2): CUG + OA (index + OA mark AS),

(3): No CUG (ordinary call).

Note 3 — ICB means incoming calls barred within the CUG. The interpretation logic is changed in this case as shown in each column in the table.

For example: _

No ICB	ICB
M (1)	REJ

{
This means that when the interlock codes are matched and no
ICB is applied for the CUG, then (1) is used. However, when ICB is applied for the CUG, the incoming call is rejected even if interlock codes are matched.
}

Note 4 — M means that the interlock code is matched with the CUG of the called user.

Note 5 — NM means ‘‘ not matched’’.

Note 6 — REJ means that an incoming call is rejected.

Note 7 — Interpretation logic, e.g.:

$$\left[\$\$6oM\ \ \$\$\,6u\,(3)\$\$\,6e\right]$$

means that when matched with CUG, no CUG selection facility field is set in the SETUP to the called user.

Tableau 1-2/Q.85 [T2.85], p. 7

Figure 1-6/Q.85, p. 8

Figure 1-7/Q.85, p. 9

Figure 1-8/Q.85 (feuillet 1 sur 2), p. 10

Figure 1-8/Q.85 (feuillet 2 sur 2), p. 11

Figure 1-9/Q.85, p. 12

Figure 1-10/Q.85 (feuillet 1 sur 5), p. 13

Figure 1-10/Q.85 (feuillet 2 sur 5), p. 14

Figure 1-10/Q.85 (feuillet 3 sur 5), p. 15

Figure 1-10/Q.85 (feuillet 4 sur 5), p. 16

Figure 1-10/Q.85 (feuillet 5 sur 5), p. 17

1.6 *Network physical allocation scenarios*

H.T. [T3.85]
TABLE 1-3/Q.85
Network physical allocation scenario A

	FE1	FE2	FE3	FE4	FE5	FE6
A.1	TE/NT2	LE1	LE1	LE2	LE2	TE/NT2
A.2	TE/NT2	LE1	DB1	LE2	DB1	TE/NT2
A.3	TE/NT2	LE1	DB1	LE2	DB2	TE/NT2
A.4	TE	NT2A	NT2A	NT2A	NT2B	TE

Cuadro 1-3/Q.85 [T3.85], p.

The *network scenario A.1* | represents the decentralized approach of the CUG service implementation.

The *network scenario A.2* | describes the fully centralized approach with a unique data base (DB1).

The *network scenario A.3* | describes a centralized approach with two data bases (DB1 and DB2).

In *the network scenario A.4* , | the CUG service is handled in the NT2s and then the network is transparent for this service.

Recommendation Q.86

CHARGING SUPPLEMENTARY SERVICES

1 Credit card calling service

Under study.

2 Advice of charge supplementary service (AOC)

advice of charge is a service allowing the user paying for a call to be informed of usage-based charging information. This service is not meant to replace the charge meeting inside the network which is considered to be the correct one in all cases.

This service may include one or more of the following cases:

a) charging information at the end of a call;

b) charging information during a call;

c) charging information at call setup time.

2.1 *General*

2.1.1 *Charging information at the end of the call*

The possibility for a user to receive charging information for a call when the call is released.

2.1.2 *Charging information during a call*

The possibility for a user to receive charging information for a call during the active phase of the call.

2.1.3 *Charging information at call setup time*

The possibility for a user to receive information about the charging rates at call setup time and possible change of charging rates during the call.

2.2 *Description*

2.2.1 *Charging information at the end of a call*

2.2.1.1 *General description*

This case of the supplementary service provides the user with charging information for a call when the call is released. The charging information may consist of a number of information units such as:

— case of advice of charge

— charging at the end of a call

— type of charging

— free of charge

— charged amount information

— used number of charging units

— used duration

— used volume

— used number of times (Note)

— charging rate information

— price per time unit and time units

— price per volume unit and volume units

— price per number of times unit and number of times unit

— duration per charging unit and charging units

— volume per charging unit and charging units

— number of time units per charging unit and charging units

Note — Number of times should be used, e.g. to charge a certain number of supplementary service invocations.

— usage charge element

— registration

— call attempt

— invocation

— duration

— volume

— network processing

— billing identification

— normal charging

— reverse charging

— credit card charging

The selection of these values is a national matter.

2.2.1.2 *Specific terminology*

Not applicable.

2.2.1.3 *Qualifications on the applicability to telecommunication services*

This supplementary service is applicable to all telecommunication services.

2.2.2 *Charging information during a call*

2.2.2.1 *General description*

This case of the supplementary service provides the user with information that may be either incremental or cumulative and will be sent automatically or on request.

The charging information may consist of a number of information units such as:

— case of advice of charge (AOC)

— incremental charging during a call, or

— cumulative charging during a call

— type of charging

— free of charge

— charged amount information

— used number of charging units

— used duration

— used volume

— used number of times (Note)

— charging rate information

— price per time unit and time units

— price per volume unit and volume units

— price per number of times unit and number of times unit

— duration per charging unit and charging units

— volume per charging unit and charging units

— number of time units per charging unit and charging units

Note — Number of times should be used, e.g. to charge a certain number of supplementary service invocations.

— usage charge element

— registration

— call attempt

— invocation

— duration

— volume

— network processing

— billing identification

— normal charging

— reverse charging

— credit card charging

2.2.2.2 *Specific terminology*

Not applicable.

2.2.2.3 *Applicability to telecommunication services*

This supplementary service is applicable to all telecommunication services.

2.2.3 *Charging information at call setup time*

2.2.3.1 *General description*

This case of the supplementary service provides the user with the possibility to receive information about the charging rates at call establishment. In addition, the user will be informed if a change in charging rates takes place during the call. The charging information may consist of a number of information units such as:

— case of advice of charge

— charging rate information

— type of charging

— free of charge

— charging rate information

— price per time unit and time units

— price per volume unit and volume units

— price per number of times unit and number of times unit

— duration per charging unit and charging units

— volume per charging unit and charging units

— number of time units per charging unit and charging units

— usage charge element

— registration

— call attempt

— invocation

— duration

— volume

— network processing

— billing identification

— normal charging

— reverse charging

— credit card charging

2.2.3.2 *Specific terminology*

Not applicable.

2.2.3.3 *Applicability to telecommunication services*

This supplementary service is applicable to all telecommunication services.

2.3 *Derivation of a functional model*

The model used for illustrating the advice of charge (AOC) supplementary service is given in Figure 2-1/Q.86 below.

Figure 2-1/Q.86, p.

2.4 *Information flow diagrams*

This Recommendation does not describe which information is to be provided in each case because it is considered to be a network dependent matter whether the information is provided, e.g. as charging units or as currency units.

It is assumed that the coding of the charge advice information (CAI) is done in such a way that whenever this information is received by a user, the content shall be self explaining.

2.4.1 *Information flows for charging at the end of a call*

Figure 2-2/Q.86 (feuillet 1 sur 2), p. 20

Figure 2-2/Q.86 (feuillet 2 sur 2), p. 21

Figure 2-3/Q.86, p. 22

Figure 2-4/Q.86 (feuillet 1 sur 2), p. 23

Figure 2-4/Q.86 (feuillet 2 sur 2), p. 24

Figure 2-5/Q.86, p. 25

2.4.2 *Information flows for charging information during a call*

Figure 2-6/Q.86 (feuillet 1 sur 3), p. 26

Figure 2-6/Q.86 (feuillet 2 sur 3), p. 27

Figure 2-6/Q.86 (feuillet 3 sur 3), p. 28

Figure 2-7/Q.86, p. 29

2.4.3 *Information flows for information about charging rates*

Figure 2-8/Q.86 (feuillet 1 sur 3), p. 30

Figure 2-8/Q.86 (feuillet 2 sur 3), p. 31

Figure 2-8/Q.86 (feuillet 3 sur 3), p. 32

2.5 *SDL - Diagrams for the functional entities*

Figure 2-9/Q.86 (feuillet 1 sur 2), p. 33

Figure 2-9/Q.86 (feuillet 2 sur 2), p. 34

Figure 2-10/Q.86 (feuillet 1 sur 2), p. 35

Figure 2-10/Q.86 (feuillet 2 sur 2), p. 36

Figure 2-11/Q.86 (feuillet 1 sur 2), p. 37

Figure 2-11/Q.86 (feuillet 2 sur 2), p. 38

2.6 *Functional entity actions*

2.6.1 *Functional entity actions for FE2*

— request charging information from FE3/FE2

— send the charging information to FE1

2.6.2 *Functional entity actions for FE3*

— control the charging functions

— request charging information from FE4

— send the charging information to FE2

2.6.3 *Functions entity actions for FE4*

— provide the charging information

2.7 *Allocation of Functional entities to physical location*

H.T. [T1.86]
TABLE 2-1/Q.86

Functional entity Scenario	FE1 = CRE	FE2 = 1.CC	FE3 = CCE	FE4 = CPE
{	TE			
{	TE			
{	TE			
{	TE			

Tableau 2-1/Q.86 [T1.86], p. 39

BLANC